Difficult-to-Fill Jobs Study
Brief Report

Economic Research and Analysis Unit

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Department of Workforce Services

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Mark Knold, *Senior Economist*
Department of Workforce Services
Phone: 801-526-9458 | **Email:** mknold@utah.gov

DIFFICULT-TO-FILL JOB STUDY **INTRODUCTION**

In recent years, Utah businesses have expressed concern about the lack of qualified applicants to fill job openings. These labor shortage conversations have revolved around the disconnect between what the business community is looking for from the labor force and what skills and abilities that labor force can provide. A key term that often arises from said discussions is "skills gap," the concept that the labor force does not carry the essential skills in the necessary quantity to meet the business community's evolving demands.

Skills gap conversations almost exclusively center on the shortcomings of the labor force and, by extension, perceived deficiencies within the education community that develops the labor force. The employer community's role is often excluded or given minimal consideration. Yet a balanced skills gap conversation should include a deeper perspective of the employer community's role.

Workforce Services desired to better understand and empirically measure the employer community's desires and efforts in their quest for Utah labor. In partnership with the Center for Public Policy and Administration (CPPA) at the University of Utah, Workforce Services created this Difficult-to-Fill Jobs Study. In-depth interviews were conducted with over 1,000 Utah private-sector employers who identified they had experienced difficulty in filling at least one occupation within the past year. Workforce Services believes the Difficult-to-Fill Jobs Study is an added contribution toward understanding how businesses view the labor shortage issue and illuminating their perceptions of the underlying cause.

If concerns were to be found and actionable guidance suggested to the education community, the greatest benefit is to address the highly-skilled and highly-educated occupations; those that require more training and investment. The higher-education community develops these occupations, and these occupation's strength are they lead an economy's growth, wealth, and competitiveness. Therefore, targeting highly-skilled and highly-educated occupations became the survey's emphasis — with much centered upon science, technology, engineering and mathematics (STEM). Industries that employ said occupations were the foundation of the sample.

There are multiple levels of depth that can be mined when measuring the employer and labor force communities. But including all possibilities in one survey is costly, can dilute a survey's focus, and the necessary magnitude of questions upon those who generously give their time to be surveyed is prohibitive. Therefore, this survey does not address or quantify the level of demand that exists in the Utah economy for STEM or other high-skilled occupations. It is only designed to evaluate what employers report as their difficult-to-fill occupations, and then to give some added perspective around that.

The survey was structured from a stratified random sample of private-sector employers, based upon firm employment size, industry classification and geography. Only the private sector was selected as it is the largest segment within the Utah economy and is the most dynamic and flexible in responding to the marketplace. Only Utah's metropolitan areas were surveyed, as STEM jobs are known to be concentrated in metropolitan areas, and Utah's metropolitan areas cover 90 percent of Utah's jobs.

The survey was designed by Workforce Services with guidance from the Center for Public Policy and Administration (CPPA) at the University of Utah. CPPA also managed the survey's data collection in partnership with Lighthouse Research & Development, Inc. The majority of the data collected came via telephone interviews, although an online portal was made available to employers for self-input. The survey interview period spanned from October 2014 to January 2015. The survey results were coded, arranged and analyzed by Workforce Service's economic division.

DIFFICULT-TO-FILL JOB STUDY **INTRODUCTION**

PRIMARY RESEARCH OBJECTIVES :

Collect data on occupations that are considered "difficult to fill" by employers in key industries (high-skill and high-education). Measure the dynamics of any perceived or actual skills shortages within Utah's labor market.

QUESTION THEMES :

- Establish a baseline count of the number of difficult-to-fill occupations.
- Determine the title and Standard Occupational Classification (SOC) System code of the difficult-to-fill occupations.
- Understand why hiring managers are having trouble filling these positions.
- What do they perceive as the issue (lack of skills, education, challenging working conditions, low pay, etc.)?
- Determine what skills and certification are most important for difficult-to-fill occupations, and how difficult it has been to find those qualifications.
- Establish the qualifications expected from candidates for each occupation.

KEY FINDINGS

Response and Participation Rates

Over 44 percent of the 1,197 establishments that were contacted fully participated in the survey, and another 5 percent provided partial responses before dropping out. About half as many (22 percent) refused to participate in the study.

Nearly two-thirds of the establishments that fully participated reported that they had some degree of difficulty filling positions at their location in the last 12 months. Despite the majority of respondents indicating they were experiencing some hiring challenges, their responses also suggest the vast majority of their various job openings were being filled without difficulty. In fact, difficult-to-fill openings represented less than one-quarter of total job openings in our sample.

Reasons Difficult-to-Fill Jobs Present Hiring Challenges

The majority of respondents cited that not enough applicants was their biggest hiring challenge. Respondents most often identified the "lack of applicants," which implies a limited supply of labor. The next most often cited reasons were "lack of job-specific knowledge, skills and

abilities" and "lack of work experience," with both suggesting that the available workforce was unqualified for the job.

Most Important Knowledge, Skills and Abilities to be Successful in Difficult-to-Fill Jobs

Respondents could specify the three most important knowledge, skills and abilities (KSAs) for success in a given difficult-to-fill occupation. In total, respondents cited soft skills 33 percent more often than hard skills. Even though soft KSAs, like professionalism or honesty, made up the majority of the survey's responses, a hard skill was the top mentioned, it being "computers and electronics or engineering and technology."

The requisite KSAs varied dramatically from occupation to occupation. Specifically, those occupations categorized as STEM required much higher levels of hard skills. STEM occupations mentioned hard KSAs twice as often as soft KSAs, and over one-third of all KSAs for STEM jobs were related to computers and electronics or engineering and technology.

The Role of Wages

"Low wages" ranked seventh among the ten reasons employers felt difficult-to-fill jobs presented a hiring challenge. In total, only 22 percent of respondents felt that low offered wages played a role in their inability to fill job openings. Workforce Services' analysis of all employer's offered wages for difficult-to-fill jobs revealed that 68 percent of establishments tendered wage offerings below the median for each specific occupation. Despite the employer's general perception that low wages are not an overriding issue, relatively low offered wages compared to occupational norms may be playing a noteworthy role in making job openings difficult to fill. With the majority of respondents offering low wages relative to the occupational median, we cannot singularly state that the hiring issues businesses face are exclusively skills, education or experience related.

Expanding the Conversation

Many difficult-to-fill job conversations often revolve around the lack of KSAs, education or experience of the workforce. The Difficult-to-Fill Jobs Study cites hiring managers' concerns and chronicles qualifications they desire from applicants. The study also had an evaluative independence in that it can appraise offered wages against market forces. That evaluation infers that wages should be a part of the conversation. Just as educators, policy makers, and workers need to understand the KSAs, education and experience required to build a competitive workforce, employers must appreciate the impact wage offerings have on attracting talent from that competitive marketplace.

The Value of Adding Wages in the Discussion

Without considering offered wages, all difficult-to-fill occupations can easily be labeled as a "skills gap," even when that may not be the underlying reason. The value of the wage conversation is that it can moderate this casting-of-a-broad-net upon the skills gap dialogue. When market-aggressive wage offerings are found and labor difficulty still remains, this helps to better isolate potential skill, certification or training shortages.

This survey desired to categorically find such isolations, yet the measured wage advertisements did not produce such clarity. Low wage offerings were too prevalent throughout the findings to confidently isolate any specific skill issues. Only production occupations came close and offered a compelling case for further evaluation.

Production occupations can include assemblers and fabricators, metal workers, machinists, welders, grinders, woodworkers, plant operators, chemical and petroleum equipment operators, among others.

JOB OPENINGS THAT ARE COMPOSED OF **DIFFICULT-TO-FILL OCCUPATIONS**

QUESTION 1 :

In the last 12 months, please estimate how many total job openings your establishment had. (Please include current job vacancies.)

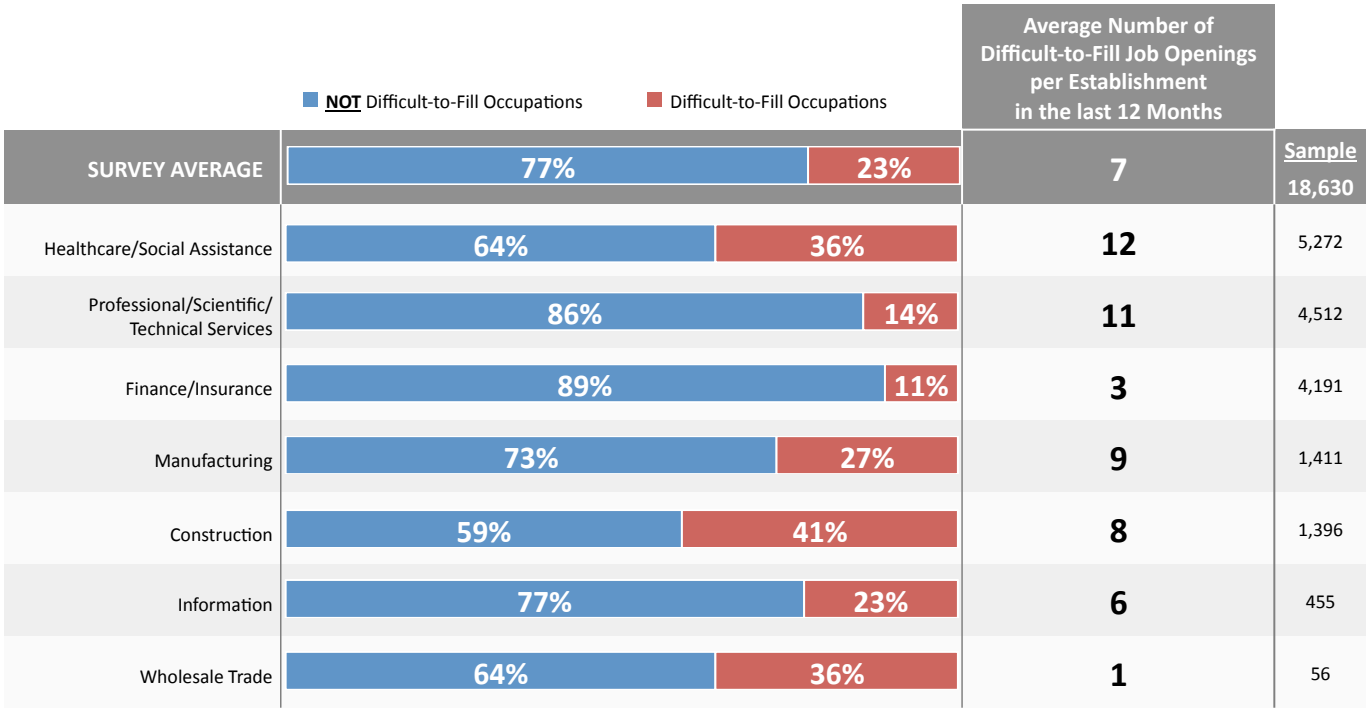
QUESTION 2 :

For each of your difficult-to-fill occupations, estimate approximately how many job openings your establishment had in the last 12 months.

RESULTS :

Examining job openings helps to put the size of the difficult-to-fill jobs problem into context. While nearly two-thirds of the establishments that fully participated in the survey had at least one difficult-to-fill occupation in the last year, the vast majority of their total job openings were not difficult-to-fill. Less than one-quarter of all job openings were composed of difficult-to-fill occupations. Establishments had an average of seven job openings that proved challenging to fill in the last 12 months.

Distribution Of Job Openings That are Considered "Difficult-to-Fill" and Not "Difficult-to-Fill" by Industry Sector



STEM OCCUPATION ANALYSIS

One of this study's primary objectives was to explore the employment challenges for highly-skilled occupations, the impetus being that occupations with rigorous KSAs and educational requirements are more likely to experience labor shortages given the more demanding path workers must invest in themselves to get to such a level. The selection of specific industries was deliberate so to focus upon these highly-skilled occupations. Once the data were collected, employer-specified job titles had to be coded into standard occupational codes that could then be classified into STEM or Non-STEM occupations.

Segmenting into STEM and Non-STEM helps to isolate out the highly-skilled difficult-to-fill occupations. Yet even then, many employers who do hire STEM workers were just as likely to identify a Non-STEM occupation as one of their difficult-to-till occupations. A banking firm was just as likely to state their difficult-to-fill occupation was for a teller as it was for an accountant or a financial manager.

The STEM and Non-STEM segments revealed striking insights into the hiring difficulties for highly-skilled occupations compared to occupations lesser-skilled. Perhaps the most interesting finding was the relatively small proportion of STEM occupations as a percent of total difficult-to-fill jobs. After all, the survey targeted STEM employers.

Despite stratifying the survey sample by specific industries in an attempt to focus on highly-skilled jobs, the results showed that less than one-quarter of the difficult-to-fill occupations were STEM related. The data suggest that the majority of difficult-to-fill jobs — even in the higher-level technical industries — are in lesser-skilled occupations.

Still, STEM occupations had their share of the reported difficult-to-fill occupations, and comparisons among the two groups are relevant:

- The level of difficulty filling STEM jobs — in terms of the average number of days these positions went unfilled — was much higher than Non-STEM;
- The basic qualifications required of STEM applicants — in terms of advertised levels of education and experience — far exceeded those of Non-STEM applicants;
- The offered wages for STEM occupations were significantly higher than those in Non-STEM; and
- Respondents identified that hard KSAs were most important for success in STEM jobs than Non-STEM.

Occupations with the Most Job Openings

Non-STEM

Top 15 Difficult-to-Fill Occupations
Personal Care Aides
Nursing Assistants
Heavy & Tractor-Trailer Truck Drivers
Tellers
Production, Planning and Expediting Clerks
Social and Human Service Assistants
Maids and Housekeeping Cleaners
Stock Clerks and Order Fillers
Childcare Workers
Preschool Teachers, Except Special Education
Electricians
Medical Assistants
Customer Service Representatives
Food Servers, Non-restaurant
Construction Laborers

STEM

Top 15 Difficult-to-Fill Occupations
Registered Nurses
Software Developers, Systems Software
Computer User Support Specialists
Emergency Medical Technicians and Paramedics
Heating, Air Conditioning and Refrigeration Mechanics and Installers
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
Aerospace Engineers
Software Developers, Applications
Web Developers
Psychiatrists
Industrial Production Managers
Computer Occupations, All Other
Managers, All Other
Architectural and Civil Drafters
Database Administrators

STEM COMPOSITION OF SURVEY RESULTS BY MAJOR OCCUPATIONAL GROUP

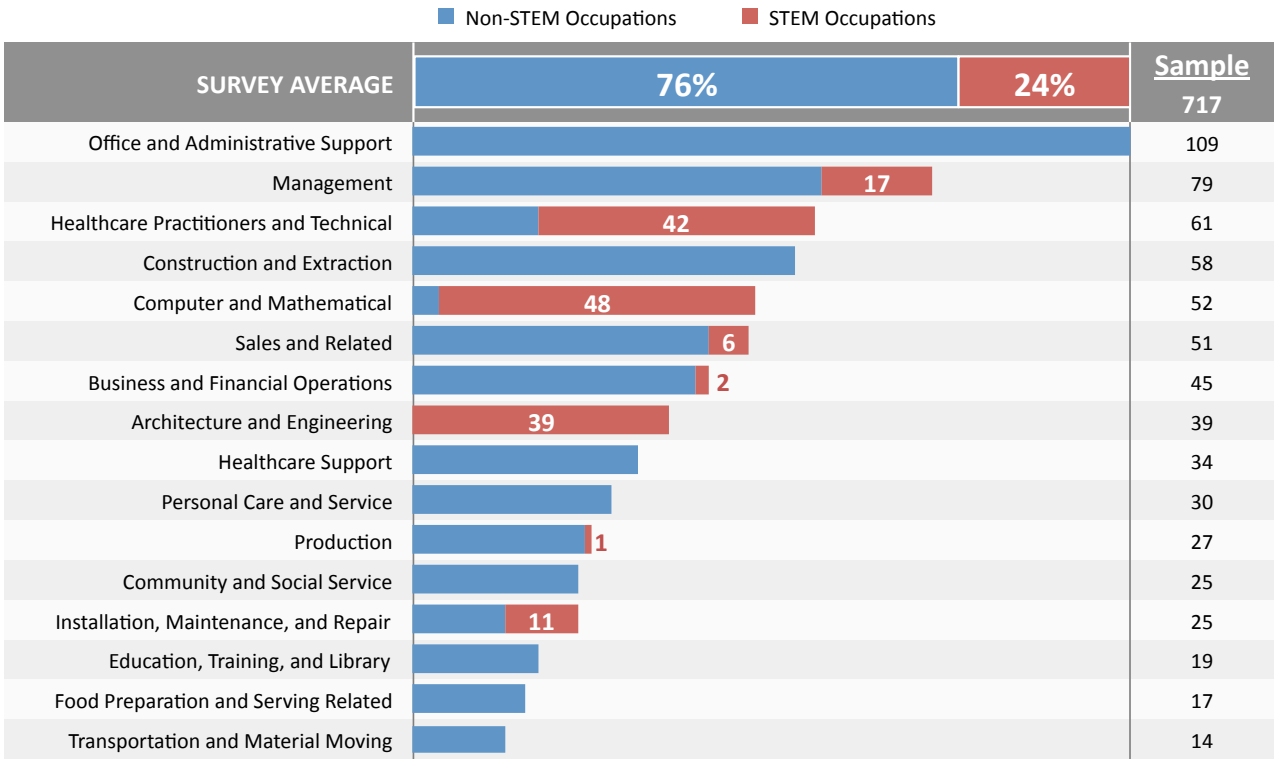
QUESTION :

Of these [Insert Number] unique occupations, how many would you consider difficult to fill?

RESULTS :

Even though the sample was designed to minimize the number of "lower skilled" and "lesser educated" occupations, respondents overwhelmingly identified non-STEM occupations as the majority of their difficult-to-fill occupations. As expected, the STEM-heavy occupational groups had much higher proportions of difficult-to-fill STEM jobs. The majority of STEM jobs were in three occupational groups: computer and mathematical; healthcare practitioners and technical; and architecture and engineering. More than half of the 21 occupational groups had zero STEM related difficult-to-fill jobs.

The Number of Difficult-to-Fill Occupations in Major Occupational Categories



OFFERED WAGES DISCUSSION

Wages must be an important factor to consider when examining difficult-to-fill jobs. Traditional economic theory suggests that wages play a major role in labor availability. If wages are offered below the market equilibrium, there will likely be a labor shortage as workers will gravitate toward more lucrative employment opportunities in other occupations. Wages set below market equilibrium can occur if businesses are unaware of competitive wage rates, do not respond to changing economic conditions, or are unable to offer competitive wages due to profitability or other internal constraints.

In many cases, wages for vacant positions are not made public nor are they provided to the applicant prior to being offered the position. However, there are several publicly available sources that estimate (and in some cases reveal) company-specific wage data. Furthermore, establishments develop a compensation reputation through word-of-mouth based on where their wages fall relative their competition. This is all to say that while establishment-specific wage information is not perfectly transparent, informed applicants may have a feel for a company or an industry's compensation tendencies.

Each year, the U.S. Bureau of Labor Statistics (BLS) collects occupational wage information from over 4,000 Utah businesses. This information is aggregated into a tool for employers and workers to better understand market compensation rates for hundreds of unique occupations. In order to gauge difficult-to-fill offered wages against the marketplace, this study compared the offered wages in each occupation — as reported by survey respondents — to the wage range of those occupations in Utah as reported by BLS.

A significant majority of establishments did not list that low wages were a contributing factor in making some jobs difficult to fill. However, this survey's market-wage comparison illustrated that nearly 70 percent of difficult-to-fill occupations offered wages below the occupational median, and 38 percent offered wages below the 25th percentile. The extent to

which respondents offered relatively low wages varied greatly by occupation, industry and establishment size (among other variables).

Depending on the positional requirements, it is possible that offering wages below the occupational median or as low as the 25th percentile represents a competitive wage. But given the fundamental economic notion that labor does not desire to sell its services cheap, especially if labor had to invest significantly into its education and skill development, it is likely that low offered wages are a contributing factor in making some of these occupations challenging to fill.

REASONS DIFFICULT-TO-FILL OCCUPATIONS **PRESENT A HIRING CHALLENGE**

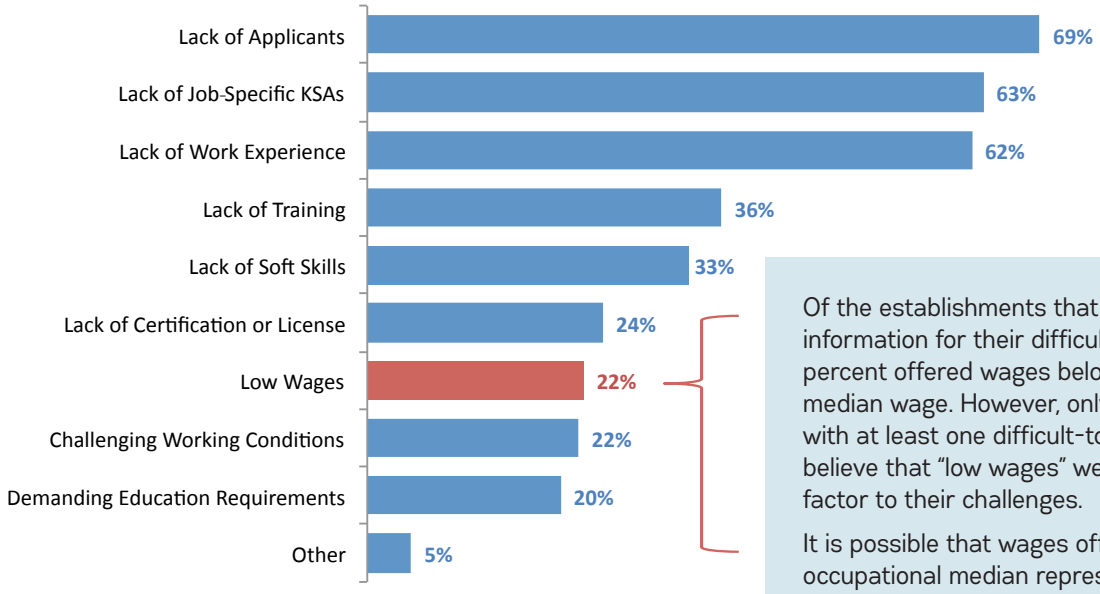
QUESTION :

Please select ALL of the reasons you believe [Difficult-to-Fill Job Title] openings were difficult to fill.

RESULTS :

Respondents were offered these ten hiring-challenge options, and were encouraged to select as many as were applicable. Respondents noted that the principal challenges faced were related to labor supply. Survey participants overwhelmingly cited "lack of applicants", "lack of job-specific knowledge, skills or abilities (KSAs)" and "lack of work experience" as reasons why their difficult-to-fill occupations presented hiring challenges. The perception among respondents was that too few candidates applied for their difficult-to-fill job openings, and/or that the applications they did receive were frequently missing the requisite skills or experience to qualify for the position. Offering low wages as a hiring challenges was only selected by one-in-five employers.

Reasons that Difficult-to-Fill Occupations Presented Hiring Challenges



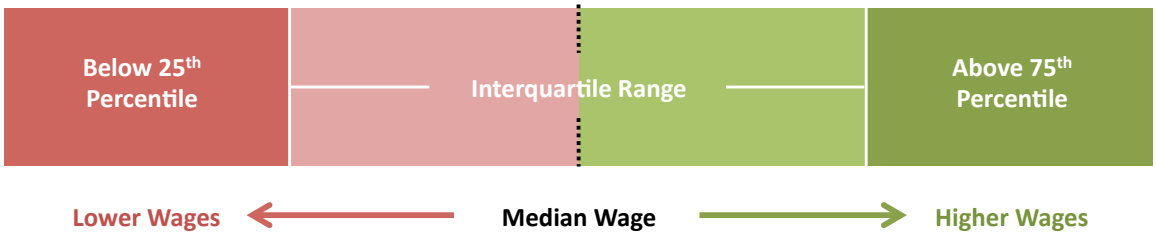
Of the establishments that provided wage information for their difficult-to-fill jobs, 68 percent offered wages below the occupational median wage. However, only 22 percent of those with at least one difficult-to-fill job opening believe that "low wages" were a contributing factor to their challenges.

It is possible that wages offered below the occupational median represent competitive wages – depending on the specific requirements of the position – but it is also possible that relatively low offered wages play a role in making difficult-to-fill jobs problematic.

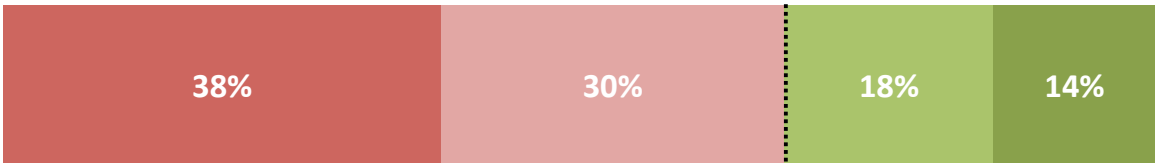
OCCUPATIONAL WAGES AND THE INTERQUARTILE WAGE RANGE

The BLS-measured wage range for every specific occupation can be dissected into four segments (interquartile). The median wage represents the mid-point of the observed wages for a given occupation. The offered wages reported for difficult-to-fill jobs were compared to the interquartile wage range of that occupation and determined to fall into one of four categories: 1) below the BLS 25th percentile; 2) between the 25th and 50th percentile; 3) between the 50th and 75th percentile; or 4) above the 75th percentile. This dissection provides a benchmark against which offered wages for difficult-to-fill jobs can be evaluated against the overall Utah marketplace. Over two-thirds of the offered wages for survey respondent's difficult-to-fill jobs were below the occupational median.

Occupational Wages as Measured by BLS



Wages Offered for Difficult-to-Fill Jobs



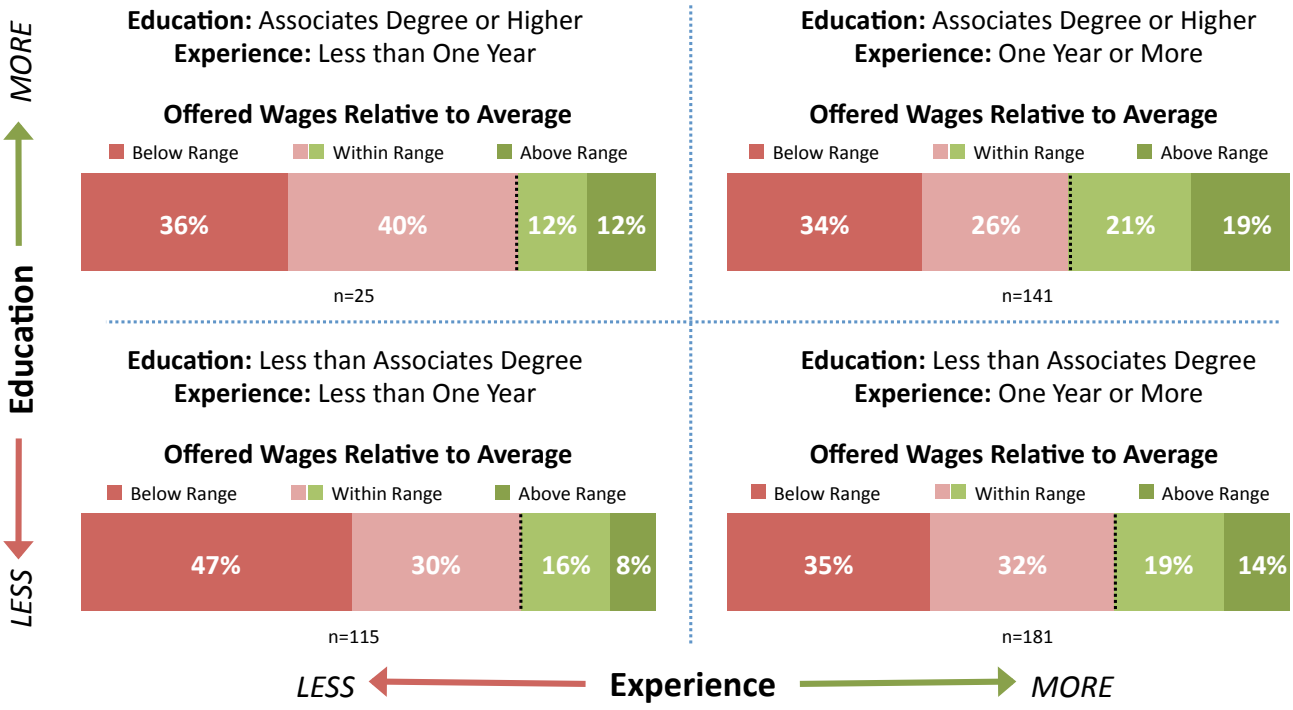
n=469

NOTE: State wages for all occupations collected through the Occupational Employment Statistics program of the U.S. Bureau of Labor Statistics. Additionally, wages offered excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.

OFFERED WAGES: ADVERTISED LEVELS OF EDUCATION AND EXPERIENCE

RESULTS :

Higher levels of advertised educational attainment and experience correlated with a greater likelihood to be paid above the wage range. Difficult-to-fill jobs that advertised lower levels of education and experience (bottom-left) offered wages below the occupational median more than three-quarters of the time. That percentage improved slightly when the advertised level of education increased (top-left), though the small sample size in this group suggests that establishments were either not looking for these candidates or they were not finding jobs with these requirements "difficult to fill." The notable increases in offered wages relative to the occupational median came with increased levels of experience. The proportion of offered wages below the median fell 10 percentage points when advertised experience increased from "less than one year" to "one year or more" (bottom-right), and another 7 percentage points when the advertised educational requirements increased along with experience (top-right). It is worth noting that even with these offered wage increases in two right quadrants, in all cases more than 50 percent of offered wages were still below the occupational median.



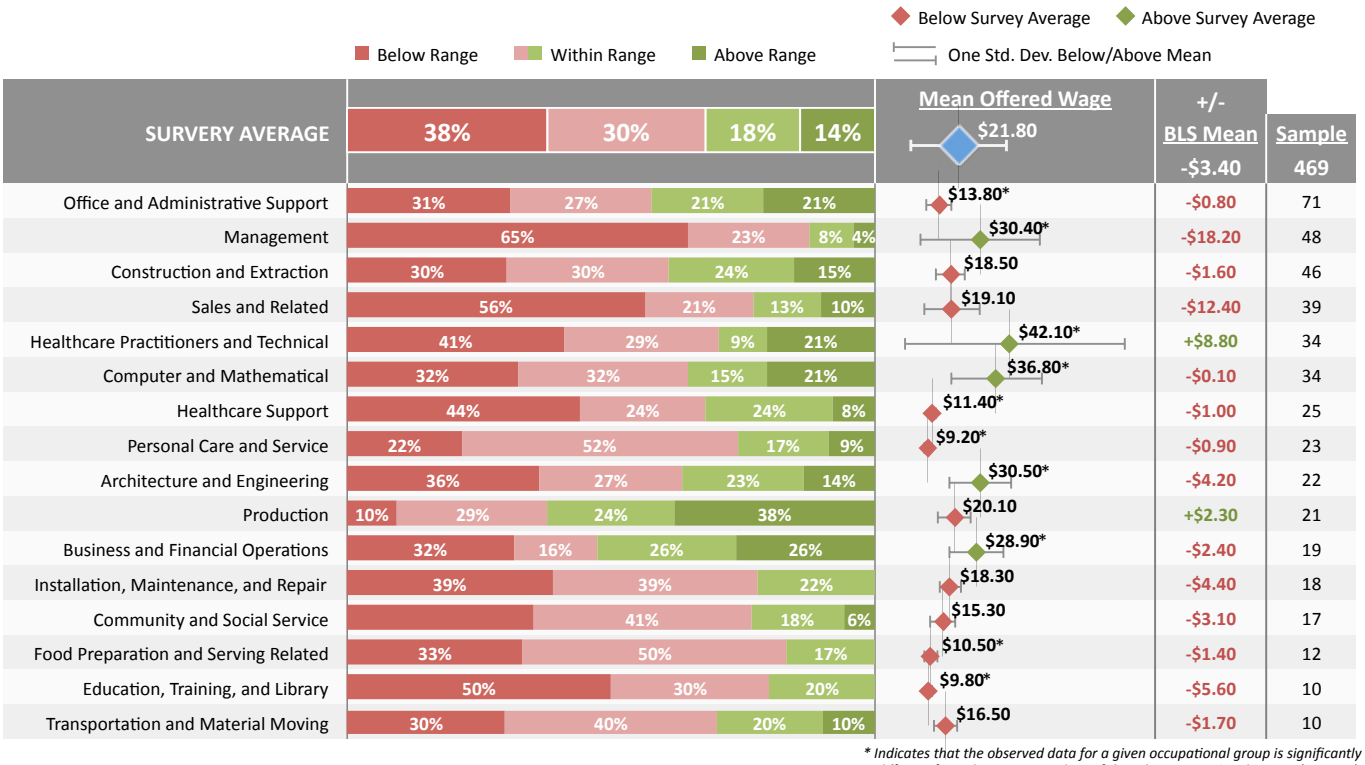
NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.

OFFERED WAGES: MAJOR OCCUPATIONAL GROUP

RESULTS :

Although most of the major occupational groups in the survey offered wages for difficult-to-fill jobs that were below the median, a few distinct trends emerged. Management and sales-related occupations offered wages well below the occupational norm. Over 50 percent of those two groups were offering wages below the 25th percentile; and in both cases, the mean hourly offered wage was at least $12 per hour lower than the BLS occupational mean. The production occupational group was the only group in which more than 50 percent of the offered wages were above the occupational median. On the surface this suggests that this occupational group's difficulties are more skill and training issues than wage considerations.

Wages Offered for Difficult-to-Fill Jobs Relative to Occupational Median



SURVERY AVERAGE	38%	30%	18%	14%	Mean Offered Wage $21.80	+/- BLS Mean -$3.40	Sample 469
Office and Administrative Support	31%	27%	21%	21%	$13.80*	-$0.80	71
Management	65%	23%	8%	4%	$30.40*	-$18.20	48
Construction and Extraction	30%	30%	24%	15%	$18.50	-$1.60	46
Sales and Related	56%	21%	13%	10%	$19.10	-$12.40	39
Healthcare Practitioners and Technical	41%	29%	9%	21%	$42.10*	+$8.80	34
Computer and Mathematical	32%	32%	15%	21%	$36.80*	-$0.10	34
Healthcare Support	44%	24%	24%	8%	$11.40*	-$1.00	25
Personal Care and Service	22%	52%	17%	9%	$9.20*	-$0.90	23
Architecture and Engineering	36%	27%	23%	14%	$30.50*	-$4.20	22
Production	10%	29%	24%	38%	$20.10	+$2.30	21
Business and Financial Operations	32%	16%	26%	26%	$28.90*	-$2.40	19
Installation, Maintenance, and Repair	39%	39%	22%		$18.30	-$4.40	18
Community and Social Service		41%	18%	6%	$15.30	-$3.10	17
Food Preparation and Serving Related	33%	50%	17%		$10.50*	-$1.40	12
Education, Training, and Library	50%	30%	20%		$9.80*	-$5.60	10
Transportation and Material Moving	30%	40%	20%	10%	$16.50	-$1.70	10

** Indicates that the observed data for a given occupational group is significantly different from the aggregate data of the other occupational groups (p < 0.01).*

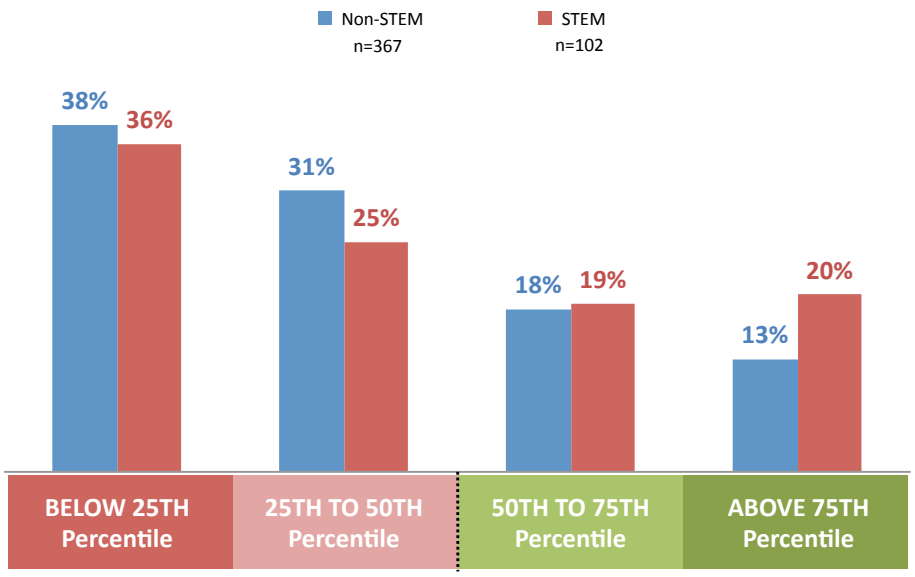
NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.

OFFERED WAGES: NON-STEM AND STEM JOBS

RESULTS :

More than 60 percent of both Non-STEM and STEM difficult-to-fill occupations offered wages below the occupational median. However, the survey suggests that Non-STEM jobs having hiring issues were more likely to offer wages below the occupational median than STEM jobs. Moreover, 20 percent of respondents with difficult-to-fill STEM occupations provided wage data that was above the 75th percentile, compared to only 13 percent of Non-STEM occupations.

Offered Wages in Non-STEM and STEM Occupations



NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.

NUMBER OF DAYS DIFFICULT-TO-FILL JOBS REMAINED OPEN

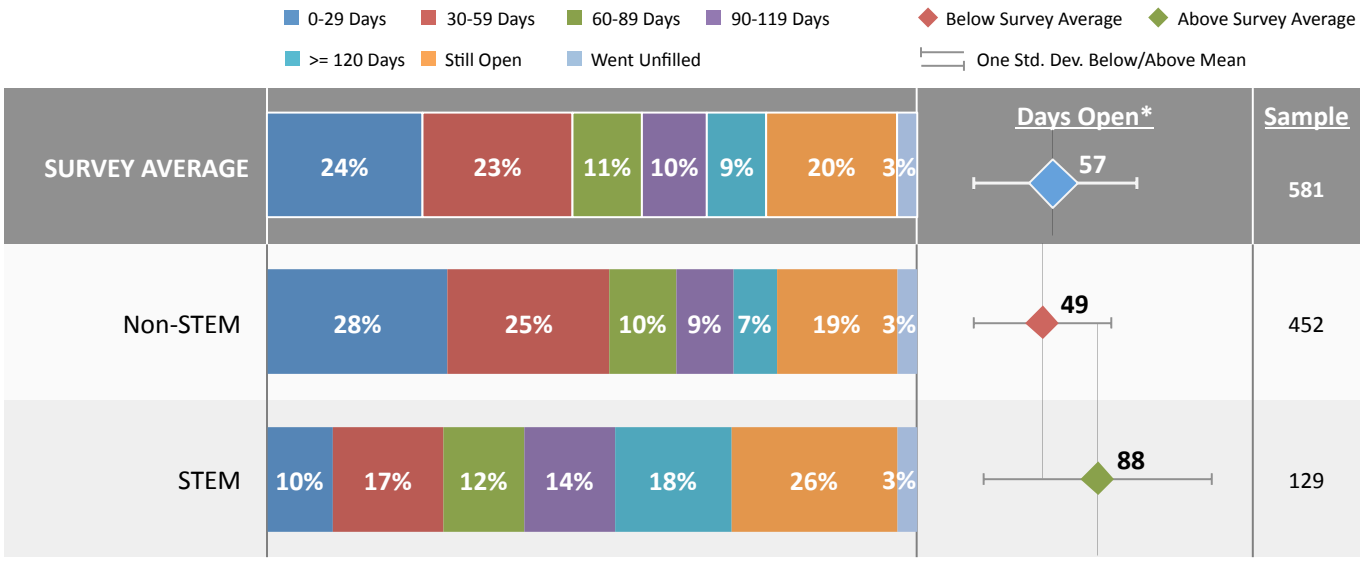
QUESTION :

On average, about how many days were your establishment's [Difficult-to-Fill] positions open before you found a candidate to fill the vacancy? (Please note if the position is still open or went unfilled).

RESULTS :

Establishments filled the majority of difficult-to-fill jobs in under 90 days. On average, these occupations went 57 days before a candidate accepted the position. There was a significant difference in the number of days Non-STEM and STEM occupations remained open. STEM occupations remained open nearly 40 days longer than Non-STEM. Moreover, 53 percent of Non-STEM jobs were filled in less than 60 days, compared to only 27 percent for STEM. Approximately one in five difficult-to-fill STEM jobs remained open for at least 120 days, compared to less than one in ten for Non-STEM jobs.

The Number of Days Difficult-to-Fill Occupations Stayed Open



NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.
**Indicates that the difference in the Non-STEM and STEM averages are statistically significant ($p < 0.01$).*

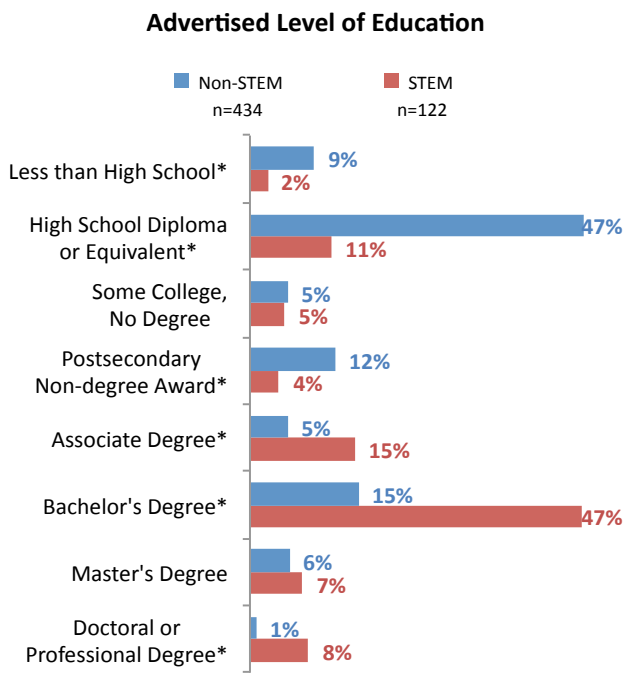
BASIC QUALIFICATIONS FOR DIFFICULT-TO-FILL JOB CANDIDATES

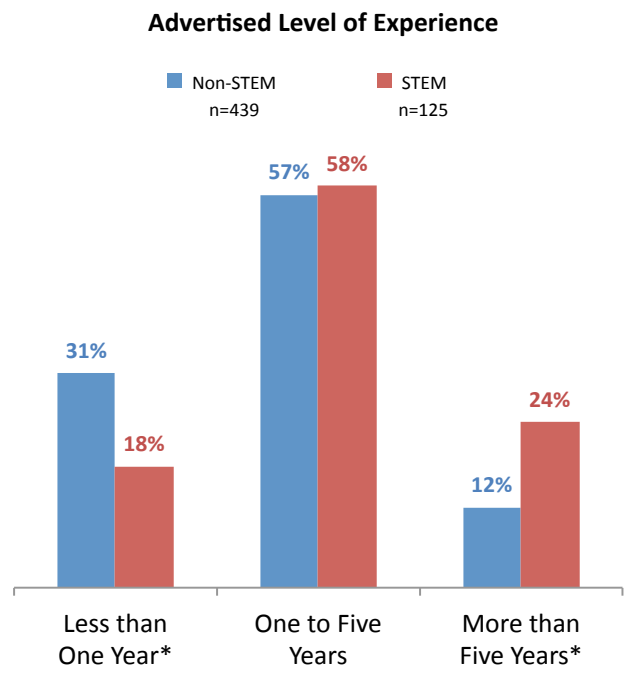
QUESTION :

In general, what level of education/work experience does your establishment advertise for [Difficult-to-Fill Job Title] applicants?

RESULTS :

The standard educational and experience expectations between Non-STEM and STEM difficult-to-fill jobs diverged in a few significant ways. In terms of advertised level of educational attainment, the majority of Non-STEM jobs required only a high school diploma or less. Conversely, over 60 percent of STEM jobs required a Bachelor's Degree or higher. From an experience perspective, the bulk of both Non-STEM and STEM jobs advertised between one and five years; though Non-STEM occupations were significantly more likely to seek candidates with less than one year of experience than STEM occupations, and vice versa for more than five years of experience.





NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.
**Indicates that the difference in the Non-STEM and STEM averages are statistically significant ($p < 0.01$).*

OFFERED COMPENSATION FOR DIFFICULT-TO-FILL JOBS

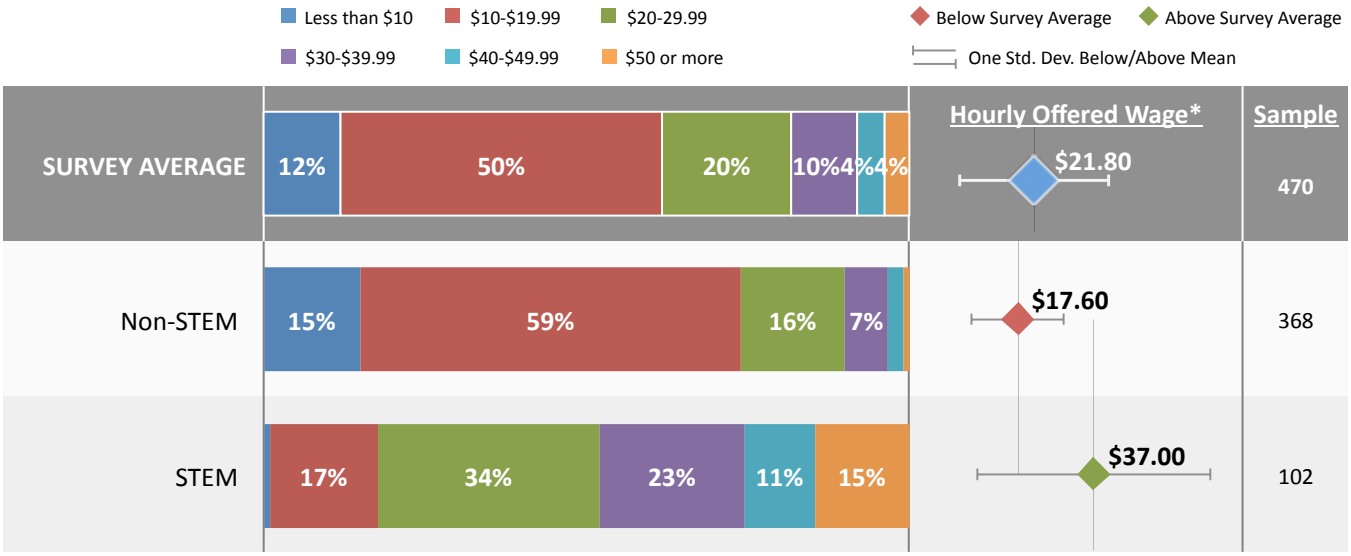
QUESTION :

On average, what is the compensation offered, excluding benefits, for [Difficult-to-Fill Job Title]?

RESULTS :

The average hourly wage offered to difficult-to-fill job candidates was nearly $22. Offered wages were expected to be above the estimated state average of $20.94, due to the higher-end industry population from which the sample was drawn. Over 60 percent of establishments surveyed offered less than $20 an hour for difficult-to-fill jobs. Respondents identified a vast difference in offered wages between Non-STEM and STEM occupations. Almost $20 an hour separates the offer wage for non-STEM jobs from the STEM jobs. More than 80 percent of the STEM jobs get offered more than $20 an hour, while only one-quarter of Non-STEM jobs were that amount. The difference in pay reflects the higher standards of education and experience for STEM jobs as well as a greater desire for STEM candidates to have "hard skills," which are more demanding to achieve than "soft skills."

The Hourly Compensation Offered to Candidates of Difficult-to-Fill Occupations



NOTE: Excludes "Refused to Answer," "Don't Know," commission-based wages, and "Other" responses.
**Indicates that the difference in the Non-STEM and STEM averages are statistically significant ($p < 0.01$).*

MOST IMPORTANT KSAs FOR DIFFICULT-TO-FILL JOBS

QUESTION :

Please list the three most important knowledge, skills or abilities (KSAs) needed to be a successful [Difficult-to-Fill Job Title].

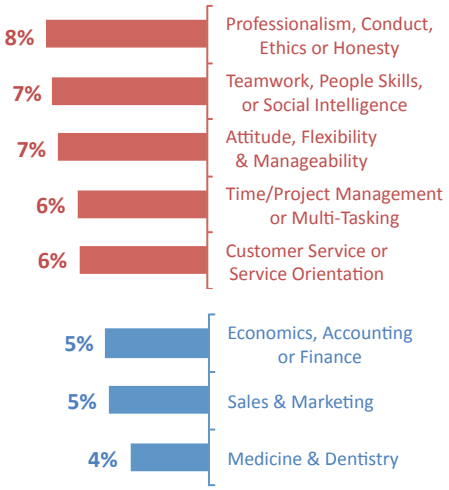
NOTE: Excludes "Refused to Answer" and "Don't Know" responses.

Additionally, the data collection and aggregation process for KSAs made statistical testing unreliable. Cannot report statistically significance differences between groups.

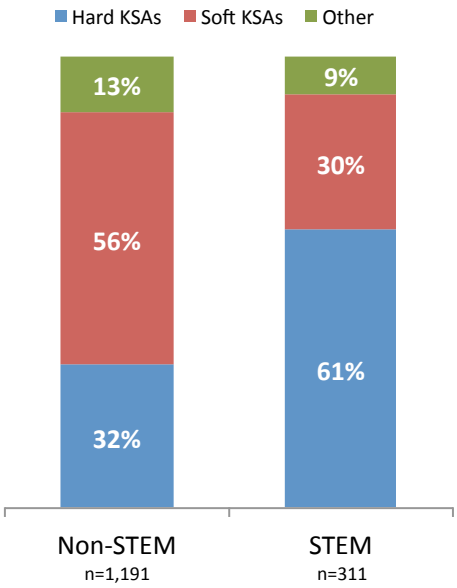
RESULTS :

Respondents self-identified the most important KSAs qualitatively via open-ended responses. The results were then coded into standard KSA categories. Overall, respondents identified soft KSAs as "most important" 50 percent of the time, compared to 38 percent for hard KSAs.* However, the proportions changed substantially between non-STEM and STEM difficult-to-fill occupations. For non-STEM jobs, respondents desired soft KSAs like professionalism, conduct, ethics and honesty. In STEM jobs hard KSAs (particularly those in computers and electronics or engineering and technology meant the most to respondents. Despite the slight majority of all respondents identifying soft KSAs as "most important for success," the most often-cite specific skills were in computers and electronics or engineering and technology related.

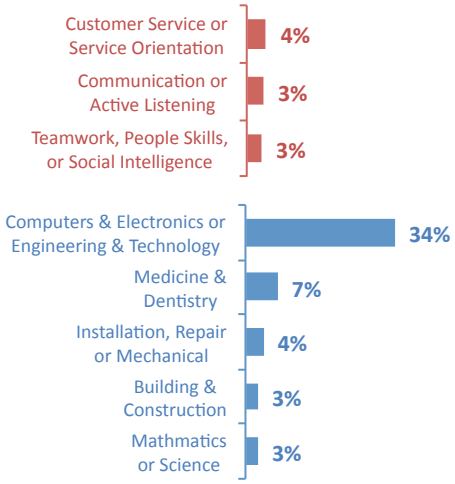
Top Knowledge, Skills and Abilities (KSAs) Identified for Non-STEM Occupations



The Difference between Non-STEM and STEM Occupations



Top Knowledge, Skills and Abilities (KSAs) Identified for STEM Occupations



APPENDIX: METHODOLOGY, STRUCTURE AND RESPONSE

Sample Design

The sample used in this research was drawn from Utah's Quarterly Census of Employment and Wages (QCEW) program between the first and third quarters of 2013. The unit of analysis is establishments, also known as worksites, as opposed to firms, which may be composed of multiple establishments.

The target population was selected by satisfying specific eligibility criteria:

1. The ownership of the establishments was private,
2. Establishments were located within selected counties,
3. Establishments' industry classifications (by NAICS codes) were within the samples selected NAICS codes, and
4. The employment levels by strata were sufficiently large. The employment size criteria varied by geographic area. Along the Wasatch Front, establishments with employment lower than 10 were eliminated (the employment cutoff was five for establishments in NAICS 52, which are finance and insurance industries). Establishments in Washington County were eliminated if they had employment lower than five.

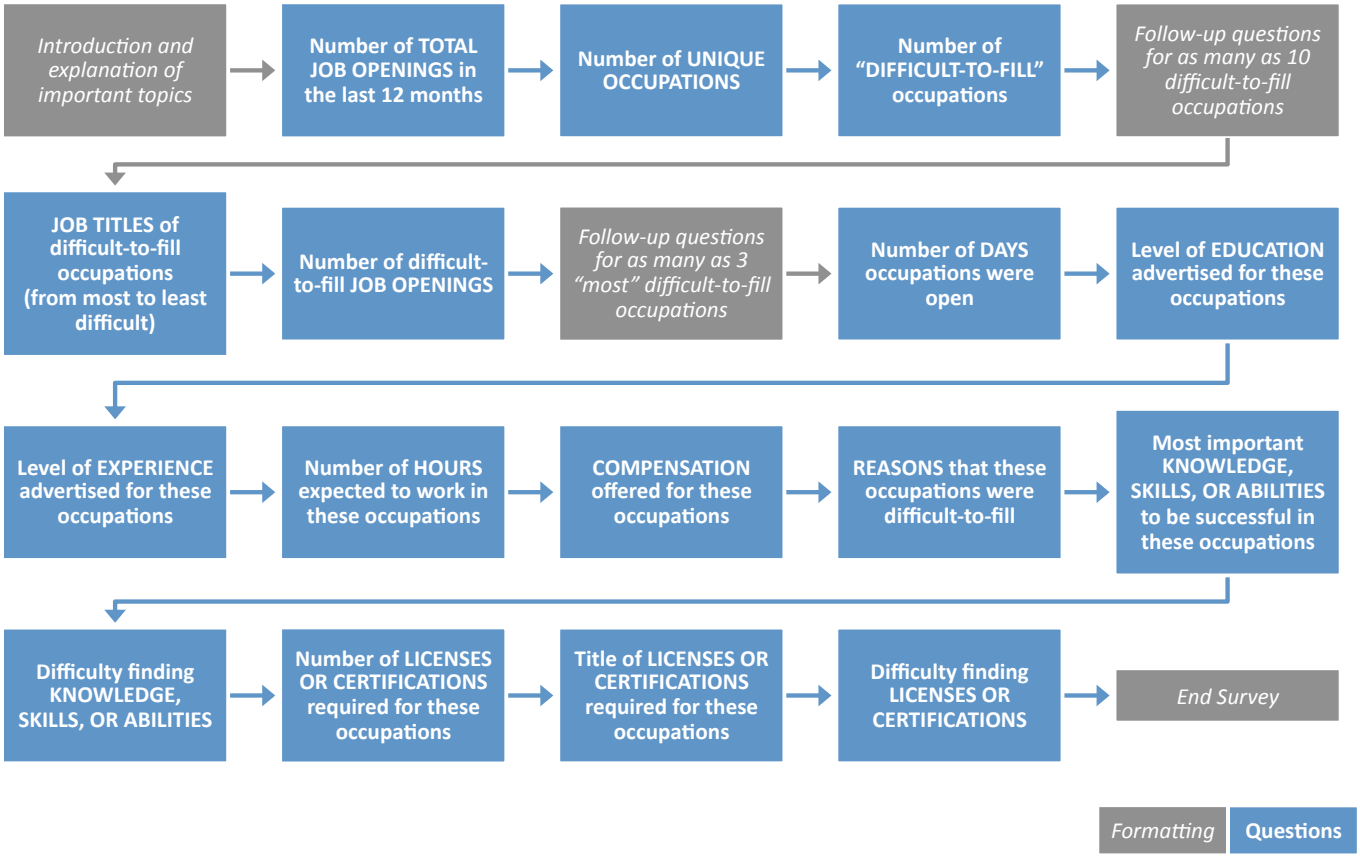
Eligible Counties
1. Box Elder
2. Cache
3. Davis
4. Juab
5. Salt Lake
6. Tooele
7. Utah
8. Washington
9. Weber

Selected Industries

NAICS Code	Industry Title	NAICS Code	Industry Title
236	Construction of buildings	511	Publishing industries, except Internet
237	Heavy and civil engineering construction	5112	Software publishers (separate)
238	Specialty trade contractors	512	Motion picture and sound recording industries
323	Printing and related support activities	515	Broadcasting, except Internet
324	Petroleum and coal products manufacturing	517	Telecommunications
325	Chemical manufacturing (except subgroup 3256 Soap, cleaning compound, and toiletry manufacturing)	518	Data processing hosting and related services
326	Plastics and rubber products manufacturing	519	Other information services
327	Nonmetallic mineral product manufacturing	522	Credit intermediation and related activities
331	Primary metal manufacturing	523	Securities, commodity, contracts and investments
332	Fabricated metal product manufacturing	524	Insurance carriers and related activities
333	Machinery manufacturing	525	Funds, trust and other financial vehicles
334	Computer and electronic product manufacturing	541	Professional and technical services
335	Electrical equipment and appliance manufacturing	5413	Architectural, engineering and related services (separate)
336	Transportation equipment manufacturing (except subgroup 3361 Motor vehicle manufacturing)	5415	Computer systems design and related services (separate)
3364	Aerospace product and parts manufacturing (separate)	621	Ambulatory health care services
4234	Professional and commercial equipment and supplies merchant wholesalers	622	Hospitals
4236	Electrical and electronic goods merchant wholesalers	623	Nursing and residential care facilities
425	Electronic markets and agents and brokers	624	Social assistance
493	Warehousing and storage		

NOTE: The selected industries are comprised of those industries considered to be high-skilled or high-education.

SURVEY STRUCTURE



SURVEY PARTICIPATION RATES

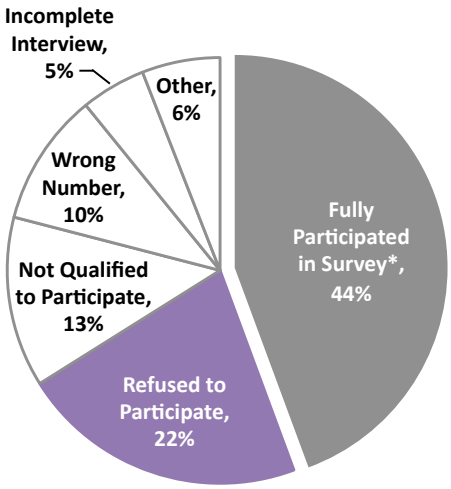
QUESTION :

May I speak to the person responsible for hiring and/or human resources at your company?

RESULTS :

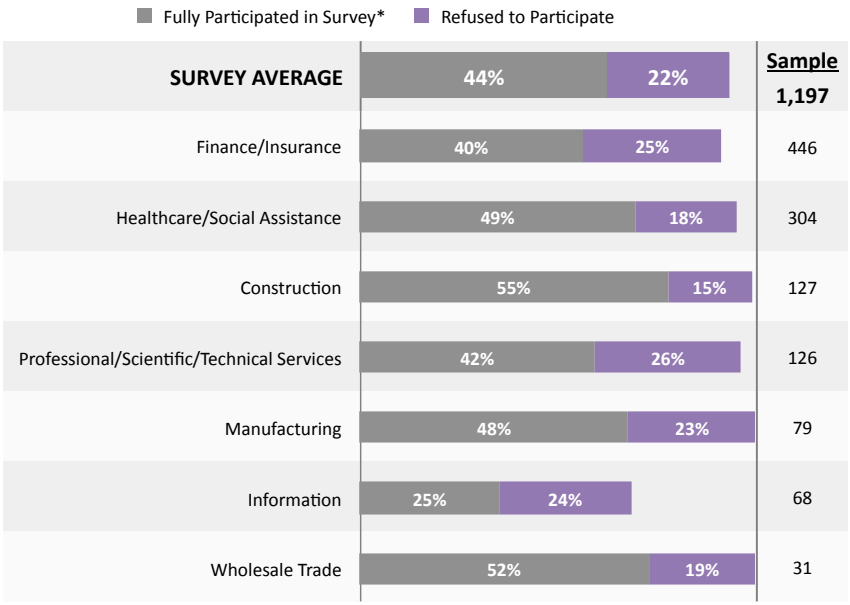
Less than half of those establishments contacted fully participated in the survey. Those that did not fully participate cited several reasons for non-response. More than one in five establishments explicitly refused to participate in the study, making it the largest non-response group. Refusal rates varied by industry sector. The professional, scientific and technical services industry refused to participate at the highest rate, while the construction industry refused at the lowest rate.

1,197 establishments were contacted via call center or entered the survey through the online portal.



n=1,197

Participation and Refusal Rates by Industry Sector:



**At Least 1 Difficult-to-Fill Job, Zero Difficult-to-Fill Jobs, Zero Openings*

RESPONSE TYPES AMONG THOSE THAT FULLY PARTICIPATED

QUESTION 1 :

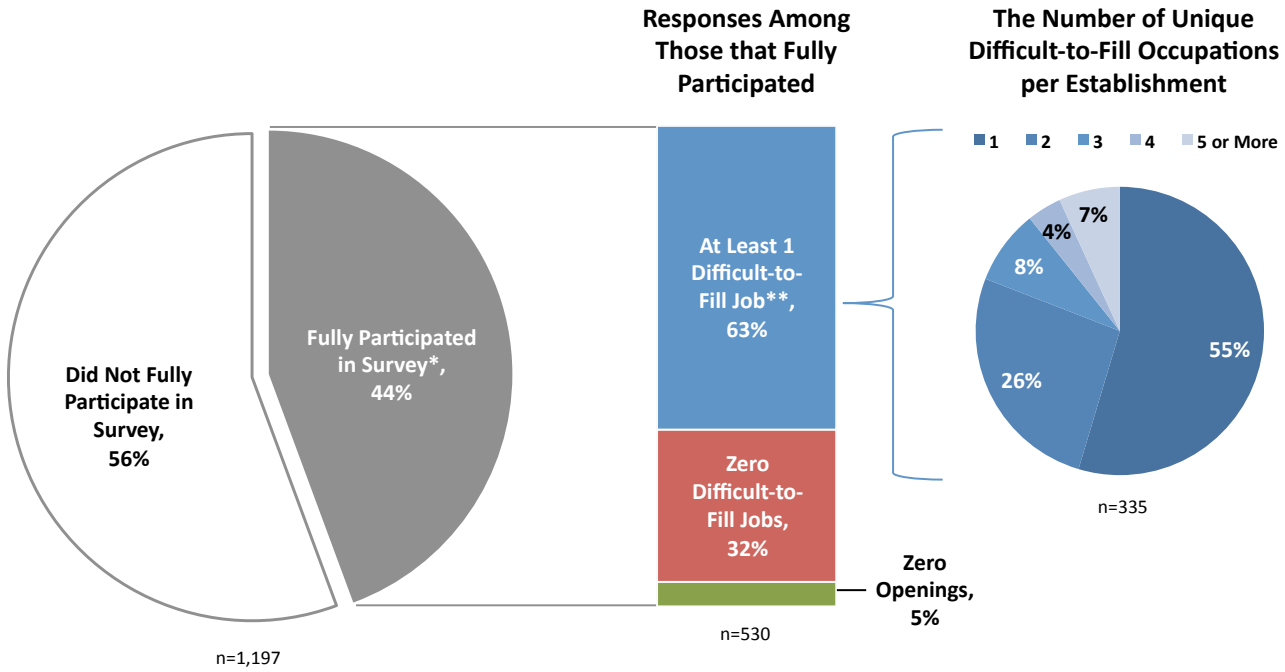
Of these total job openings, please estimate how many unique occupations your establishment had job openings for.

QUESTION 2 :

Of these unique occupations, how many would you consider difficult to fill?

RESULTS :

Nearly two-thirds of the establishments that fully participated in the survey had at least one difficult-to-fill occupation in the last 12 months. Of those, almost 90 percent had three or fewer difficult-to-fill occupations, and the majority had difficulty filling only one specific job title. Establishments with at least one difficult-to-fill job opening averaged total vacancies in more than eight unique occupations, and about three of those occupations proved difficult-to-fill. In total, fully-participating respondents identified that they had vacancies in 3,336 unique occupations in the last year and that 1,009 of those occupations presented hiring challenges (or about 30 percent).



**At Least 1 Difficult-to-Fill Job, Zero Difficult-to-Fill Jobs, Zero Openings*

***Only accounts for respondents that completed the survey (excludes respondents that had "incomplete interviews").*

PARTICIPATION RATES AND DIFFICULT-TO-FILL JOB RATES BY INDUSTRY SECTOR

QUESTION 1 :

Of these total job openings, please estimate how many unique occupations your establishment had job openings for.

QUESTION 2 :

Of these unique occupations, how many would you consider difficult to fill?

RESULTS :

The level of difficulty filling jobs varied greatly among the different industry sectors. For example, 53 percent of the finance and insurance industry had at least one difficult-to-fill job opening, while 70 percent of the healthcare and social assistance industry made that claim. The share of difficult-to-fill occupations as a percent of the total number of occupational vacancies was approximately 30 percent. Meaning, that while a substantial proportion of respondents had difficulty finding candidates to fill some occupations, the majority of their open occupations they did not consider difficult to fill.

The Number of Establishments Contacted by Industry Sector

		Percent that Fully Participated in Survey*	Responses Among Those that Fully Participated: At Least 1 Difficult-to-Fill Job** / Zero Difficult-to-Fill Jobs / Zero Openings	Percent of Total Unique Occupations that were Considered Difficult-to-Fill	Sample
SURVEY TOTAL/AVERAGE	1,197	44%	63% / 32% / 5%	30%	530
Finance/Insurance	446	40%	53% / 43% / 4%	31%	177
Healthcare/Social Assistance	304	49%	70% / 26% / 4%	33%	150
Construction	127	55%	71% / 24% / 4%	38%	70
Professional/Scientific/Technical Services	126	42%	68% / 23% / 9%	27%	53
Manufacturing	79	48%	74% / 24%	18%	38
Information	68	25%	65% / 29% / 6%	27%	17
Wholesale Trade	31	52%	38% / 44% / 19%	37%	16
Transportation/Communication/Utilities	11	36%	50% / 50%	10%	4

**At Least 1 Difficult-to-Fill Job, Zero Difficult-to-Fill Jobs, Zero Openings*

***Only accounts for respondents that completed the survey (excludes respondents that had "incomplete interviews").*

Difficult-to-Fill Jobs Study

Brief Report

2015

Economic Research and Analysis Unit

Department of Workforce Services